English Translation

Description

A dental furnace for producing compacted ceramics

The invention relates to a dental furnace for producing compacted ceramics with the preamble features of claim 1.

Such dental furnaces are used in the production of compacted ceramics in dental laboratories. A prepared workpiece in the form of a muffle, e.g. a model for a crown, is introduced into a firing chamber in order to be heated there to 850°C for example before the ceramic mass is pressed with a pneumatically driven ram into the muffle hollow chamber. The pneumatic cylinder for driving the ram sits on a firing chamber with an electric heating coil. The chamber in the firing chamber is usually placed under vacuum once the insertion opening is sealed by means of a bottom plate. The pneumatic cylinder is driven at a pressure which is reduced by a pressure reducer from the laboratory pressure (e.g. 10 bar) by hand to 5 bar for example in order to avoid overtraining the muffle in the firing chamber during the pressing process, since such single-bed masses are relatively sensitive to fracturing in the region of thin wall thicknesses.

That is why efforts have already been made to improve the muffle construction by larger wall thicknesses. This generally decreased the heat penetration, so that it was then necessary to change the pressing times, holding times or other parameters. Moreover, different muffle sizes are increasingly being used in order to enable the pressing of several teeth simultaneously. This generally leads to a weakening of the wall thickness of the muffle however, so that the dental technician would have to manually adjust the pressing pressure at the pressure reducer to such conditions. This is often forgotten or only performed on the basis of rough approximate values, which can thus lead to adverse work results or even split muffles.

It is the object of the present invention to provide a dental furnace for

producing compacted ceramics with which a secure and efficient operation is enabled.

This object is achieved by a dental furnace according to claim 1. Advantageous embodiments are the subject matter of the subclaims.

The dental furnace in accordance with the invention comprises several pressure reducers with a different working pressure, especially three pressure reducers with 4, 5 and 6 bar working or initial pressure or a proportional pressure regulator in which several different working pressures can be set in an electronically triggered manner, especially in adjustment to the respective saved heating and pressing program. A predetermined adjustment of the pressing pressure to different muffle sizes can thus be achieved. The pressure reducers are advantageously coupled with the electronic control unit, especially via pressure sensors so that the large number of possible heating and pressing curves can be assigned to the respectively appropriate initial or working pressure on the pressing cylinder. A large number of the occurring operating errors can thus be substantially excluded, so that the pressing result can be improved considerably and split muffles can be essentially avoided. This is of relevant importance in dental furnaces because otherwise the result of many hours of work can be destroyed or irretrievably damaged.

Moreover, the pressure reducers can be pre-assembled as a module and can be fastened as a component, with a duct for the pneumatic lines being preferably provided. The different pressure ranges of 4, 5 and 6 bar of initial pressure for example can also be set, e.g. for different muffles which are preferably used by a dental technician. The differently dimensioned muffle sizes and the number of teeth inserted therein can also be pre-programmed in order to then monitor the recommended initial pressure by means of sensors. These pressure sensors can be mounted especially simply by insertion into the ducts mentioned above. Moreover, several grooves can be pre-formed in a preferably extruded guide column, into which the sensors can be inserted in the simplest manner from above. As a result of such ducts at

the upper end of the guide column, the pneumatic lines can also be guided in a protected manner to the pneumatic cylinder placed on top of the firing chamber.

The invention is now explained and described by reference to the drawing in closer detail, with the (only) Fig. 1 showing a perspective view of a dental furnace in accordance with the invention.

Fig. 1 shows a dental furnace 1 whose principal configuration is briefly described below. It comprises on the one hand a support base 2 to which a guide column 6 is fastened. A pneumatic/electric control section (not shown in closer detail) is constructed in two compartments 2a, 2b. On the other hand, a firing chamber 3 is fastened to the upper end of the guide column 6, in which firing chamber a muffle 5 can be heated to several hundred degrees by means of a heating coil. The respective temperature depends on the pressed or cast material for the dental prosthesis, with the muffle 5 with a cavity for a tooth model being placed on a bottom plate 4 and being upwardly movable by means of a drive 7, so that the bottom plate 4 seals the firing chamber 3 at the bottom for the heating operation. For this purpose the bottom plate 4 is placed on a jib 4a which is fastened to carriage 7b of the drive 7 which is movable by a drive motor 7a.

The firing chamber 3 which is relatively heavy by the heating coil and the inserted pneumatic cylinder 10 is suspended in this case by means of a suspension 3a at the top in the guide column 6, which more precisely is in an upwardly open duct 8 and is fastened on the circumference with fixing parts 3b to the guide column 6. The fixing parts 3b are fastened to grooves in the guide column 6. The relevant aspect in the configuration of the guide column 6 as an extruded profile is the possibility to form at least one duct 8 therein, but preferably several ducts 8. In particular, three such ducts 8 are formed in the guide column 6 in this case, with outlet slots 8a being provided in the lower region of the ducts 8 to the control unit (not shown) on the support base 2 through which a cable harness for example can be guided from the control unit to the firing chamber 3 and pneumatic lines 9 to the pneumatic cylinder

10. Two pressure reducers 9a and 9b are interposed in the main pneumatic line 9 with a laboratory pressure of 10 bar for example which reduce the system pressure to an initial pressure of 5 bar on the pressure reducer 9a and to 6 bar on the pressure reducer 9b.

Fig. 1 also shows the configuration of the extruded profile and the stable fastening of drive 7. The two lateral ducts 8 are used in particular for cabling or pneumatic lines. Sensors can be guided in the grooves adjacent to drive 7, which grooves are incorporated simultaneously during the extrusion molding process, in order to monitor the initial pressures of the pressure reducers 9a, 9b, i.e. the desired working pressures on the pressure cylinder 10. The same applies to an alternatively provided proportional pressure regulator which not only allows setting several working pressures, but also a large number of the same in a continuous manner, so that intermediate pressure ranges of 4.7 bar, 4.8 bar, 4.9 bar, etc. can also be triggered electronically in adjustment to the respective stored process parameters.

CLAIMS:

1. A dental furnace for producing compacted ceramics, comprising a hood-shaped firing chamber into which a muffle can be inserted and which is closed in operation by a bottom plate, with a pneumatic cylinder being mounted on the firing chamber whose working pressure can be set by means of a pressure reducer, characterized in that at least two pressure reducers (9a, 9b) are each provided with different working pressure or the pressure reducer is provided in the form of a proportional pressure regulator with electronically controllable different working pressures.

2. A dental furnace according to claim 1, characterized in that the pressure reducers (9a, 9b) are arranged on a plate-like support basis (2).